

PATENT COOPERATION TREATY

PCT

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

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17. Mai 2004

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Dankend erhalten

Received with thanks
Date of mailing
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WRITTEN OPINION

(PCT Rule 66)

14/05/2004

Applicant's or agent's file reference

p200494

REPLY DUE

within 2 / 00 months/days
from the above date of mailing

International application No.

PCT/EP03/10854

International filing date (day/month/year)

30/09/2003

Priority date (day/month/year)

30/09/2002

International Patent Classification (IPC) or both national classification and IPC

C08F110/06

Applicant

BOREALIS POLYMERS OY

1. This written opinion is the first drawn up by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

3. The applicant is hereby invited to reply to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4bis.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 30/01/2005

Name and mailing address of the IPEA/

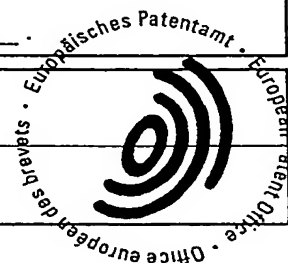


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Examiner

Formalities officer
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I. Basis of the opinion

1. The basis of this written opinion is the application as originally filed.

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability

1. In light of the documents cited in the international search report, it is considered that the invention as defined in at least some of the claims does not appear to meet the criteria mentioned in Article 33(1) PCT, i.e. does not appear to be novel and/or to involve an inventive step (see international search report, in particular the documents cited X and/or Y and corresponding claims references).
2. If amendments are filed, the applicant should comply with the requirements of Rule 66.8 PCT and indicate the basis of the amendments in the documents of the application as originally filed (Article 34 (2) (b) PCT) otherwise these amendments may not be taken into consideration for the establishment of the international preliminary examination report. The attention of the applicant is drawn to the fact that if the application contains an unnecessary plurality of independent claims, no examination of any of the claims will be carried out.

NB: Should the applicant decide to request detailed substantive examination, then an international preliminary examination report will normally be established directly. Exceptionally the examiner may draw up a second written opinion, should this be explicitly requested.

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INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

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To: NOBBE, Matthias Viering, Jentschura & Partner Centraallee 263 46047 Oberhausen ALLEMAGNE		VIERING, JENTSCHURA & PARTNER OLB 31. Jan. 2005 Frist / Due Date: <u>27/02/2005</u> (PCT Rule 66) Dankend erhalten / Received with thanks: <u>ber. uot. ue</u>		WRITTEN OPINION	
Fax nr <u>49208 2055 542</u>		Date of mailing (day/month/year) 27.01.2005			
Applicant's or agent's file reference p200494		REPLY DUE within 1 month(s) from the above date of mailing			
International application No. PCT/EP 03/10854		International filing date (day/month/year) 30.09.2003		Priority date (day/month/year) 30.09.2002	
International Patent Classification (IPC) or both national classification and IPC C08F110/06					
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Name and mailing address of the International preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo.nl Fax: +31 70 340 - 3016	Authorized Officer Parry, J Formalities officer (incl. extension of time limits) Dekker, M Telephone No. +31 70 340-4046
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I. Basis of the opinion

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed"*):

Description, Pages

1-26 as originally filed

Claims, Numbers

1-35 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

6. Additional observations, if necessary:

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-3,5-8,10,11,13,15,17,18-25,28,33-35 No. 4,9,12,14,16,26,27,29-32 Yes.
Inventive step (IS)	Claims	1-35 No.
Industrial applicability (IA)	Claims	1-35 Yes.

2. Citations and explanations

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

I. The following documents (D1-D5) will be referred:

- D1: US-A-4 294 948 (TOYOTA AKINORI ET AL) 13 October 1981 (1981-10-13)
- D2: US-A-5 413 979 (GUSTAFSSON BILL ET AL) 9 May 1995 (1995-05-09)
- D3: WO 00 08074 A (BOREALIS AS ;GAROFF THOMAS (FI); LEINONEN TIMO (FI); ALA HUIKKU SI) 17 February 2000 (2000-02-17)
- D4: US-A-5 409 875 (HSU CHENG C ET AL) 25 April 1995 (1995-04-25)
- D5: US-A-4 845 177 (VOGT HEINZ ET AL) 4 July 1989 (1989-07-04)

1. D1 US4294948 describes the following preparation of an olefin polymerisation catalyst, the parentheses delimiting individual steps:
(MgCl + ethylbenzoate (internal electron donor (IED)) + silicone oil (which according to D3 (p.20 ,I .35-p.22,I.36) modulates particle size) or kerosene, ball milled together at an unknown temperature (presumably room temperature))+ ethanol, which is then suspended in kerosene (a C10-C16 hydrocarbon mixture)+ p-cresol + Et₂AlCl (or iBu₃Al or Et₃Al) added with stirring at 50°C for 2 or 5 h followed by collection of the solid by filtration and washing with hexane. This solid is then treated at 110°C with 200ml liquid TiCl_{3.9}(OEt)_{0.1} with no other solvent present. The solid is subsequently filtered and washed with hexane. D1 is silent with respect to the Al content in the final product. Propylene is polymerised in the presence of this catalyst plus ethyl or methyl toluate and Et₃Al as cocatalyst. (see p.9-18, eg 1 in conjunction with eg 9, egs 10,11 and 14, tables 4-6). Hence claims 1-3,5-7,10,11,13,15,17,18-25,28,33-35 are not novel.

2. D2 describes in eg 1 the following: dried silanated silica agitated at 80°C for 1 h with (0.75 g MgCl₂ dissolved in ethyl acetate (IED)), dried to a free flowing powder. This is then slurried in heptane and 3.5 ml 10 wt% Et₃Al added in pentane followed by agitation for 1 h at 40°C. Then 0.32 ml TiCl₄ is added and the whole agitated at 60°C for 2 h. The whole is then dried at 100°C under a N₂ flow. There is no subsequent washing. The final Al content is 1.5%. This composition is used in conjunction with Et₃Al as cocatalyst for ethylene polymerisation (see eg 1). Hence claims 1-3,5-8,13,15,17,18-25,28,33-35 are not novel.

In light of the fact that in each of the following cases no technical effect has been demonstrated:

3. It is trivial to reduce the Al content from 1.5 to 1.0%, hence claim 4 is not inventive.
4. It is trivial to replace a hydrocarbon such as heptane with another such as toluene, hence claim 9 is not inventive.
5. It is trivial to replace an IED such as ethylbenzoate with another such as dioctyl phthalate, which is standard in the art (see D3 p.20 ,I .35-p.22,I.36), hence claim 12 is not inventive.
6. 5. It is trivial to reduce the temperature at which the IED is combined with the magnesium reagent from 80°C (D2) to 70°C, hence claim 14 is not inventive.
7. It is trivial to repeat the procedure of claim 1 on substituting the titanium element by other potential transition metal catalysts, hence claim 16 is not inventive.
8. Surfactants are not disclosed in either D1 or D2, but their use as emulsion stabilisers is standard in the art, and D4 discloses an ethylene acrylate support (col. 6, eg 1), hence claims 26 and 27 are not inventive.
9. The polymeric compounds of claim 31 ("turbulence minimising agents") are not disclosed in either D1 or D2, but the employment of small amounts of polymers such as 2 wt. % (20 000 ppm) polyisobutylene as dispersants is known in the art for precisely the same type of mixing process (see D5, eg 1: SiO₂+TiCl₃+acetone (ED)+MgCl₂ + polybutylene dispersant), hence claims 29-32 are not inventive.

Re Item VII

Certain defects in the international application

1. The nature of the "Viscoplex 2" used in the examples has not been defined.

Re Item VIII

Certain observations on the international application

The following objections are made under Art. 6 (PCT):

1. Claim 1: (i) the term "...predetermined size range" is meaningless since any range resulting from the process can be regarded as "predetermined". In any case, it attempts to define the invention in terms of a "result to be achieved", which is inadmissible (PCT GL Ch.-III,4.7).
- (ii) "precursor thereof": is this meant to be the precursor to the metal or the electron donor? In any case, such a precursor may not be readily identifiable.
- (iii) "to produce an emulsion...", "the dispersed phase of which contains more than 50 mol%..." and "in order to maintain..." are terms which attempt to define the invention in terms of a "result to be achieved", which is inadmissible (PCT GL Ch.-III,4.7).

(iv) the "droplets" have not been predefined in the claim, so one can only guess what they might be, irrespective of the fact that "droplets" here implies a liquid, such as oil, dispersed in another immiscible liquid, such as water. In any case the second immiscible medium has not been defined.

(v) "solidifying" is unclear as it implies a physical intervention on the part of the skilled man for this to occur, whereas present example 1 implies that the formation of solid particles from the emulsion itself is the result of the formation of a new solid product resulting from the interaction of the previously liquid reagents.

(vi) "n" cannot be 3, as this would define AlX₃, which is not an aluminium alkyl.

(vii) the aluminium alkyl must necessarily be added in step c, as this is the only point where the necessarily present droplets have been defined.

2. Claim 2: the terms "emulsion stabiliser" "turbulence minimizing agent" is meaningless as they have not been defined with respect to a point of reference. Thus one cannot identify what reagents will necessarily fall under these categories

3. Claim 3: "can be added" is confusing and should probably be replaced by "is added". Point 1 (vii) also applies here.

4. Claim 4: Points 1 (vi) and (vii) also apply here.

5. Claim 5: Points 1 (vi) also applies here. Claim 5 appears redundant anyway (see relevant part of claim 1).

6. Claim 11 in conjunction with claim 1 attempts to define the process of claim 1 which employs a carboxylic acid ester *product* prepared according to the process of claim 11. It cannot be ascertained that such an acid ester was prepared in this way. The claim should be redrafted as a pure process claim comprising the preparative steps of producing said acid ester.

12. Claim 16 cannot be dependent on any preceding claim as claim 15 excludes such metals. Furthermore, these metals are far removed from the titanium ubiquitously employed in the present examples.

13. Claims 23 and 24: "said denser oil" and "disperse phase oil" have not been previously defined.

14. Claim 25: (i) "insoluble oil" has not been previously defined. Moreover, insoluble in what? Furthermore, this is a "result to be achieved", which is inadmissible (CIII,4.7).

(ii) "Group IV metal" must be the previously defined TiCl₄, otherwise it cannot be distinguished therefrom.

(iii) the "less dense" oil is a "result to be achieved", which is inadmissible (PCT GL Ch.-III,4.7): "composed of" implies a product wherein the presence of two different oils of differing densities cannot necessarily be ascertained. The formulation of two phases can only be constructed within the framework of an addition of two different "oils" in

separate process steps.

15. Claim 27: the term "surfactant" is unclear, as it has not been defined with respect to a point of reference: what may be commonly regarded as a surfactant in aqueous systems may have no such property in an organic solvent

16. Claim 28: (i) points 1 (v) and 2 above apply.

(ii) "said TMA being inert and soluble..." is a result to be achieved, which is inadmissible (CIII,4.7).

17. Claim 29: (i) point 2 above applies.

18. Claims 30 and 31: it cannot necessarily be ascertained that such a polymer originated from the monomers specified in these claims.

19. Claims 33 and 34: this is a claim for a product obtained by a process. It cannot be ascertained in the final product that this material had been produced in this way.

20. Claim 35: this claim attempts to define a process ("use of a catalyst..") employing a catalyst product which is itself produced by a process. It cannot be ascertained in the final product that this material had been produced in this way.

21. Claims 2,3,8,15,16,18,25 and 31 do not appear to be supported in their entirety by the description.

22. The term "preferably" used in several claims is vague.

The subject matter related to the above-mentioned objections will be ignored with respect to the objections under Box V above, since being unclear, it cannot be considered limiting for the scope of the claims.